

Report

Turkey red – Annotated bibliography

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Description

1765. Mémoire contenant le procédé de la teinture du coton rouge-incarnat d'Andrinople sur le coton filé. Paris: l'Imprimerie Royale.

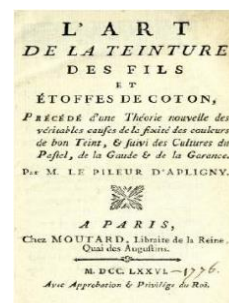
First publicly available method for dyeing Turkey red published by French Government. Provides description of typical 'old process' for Turkey red dyeing.

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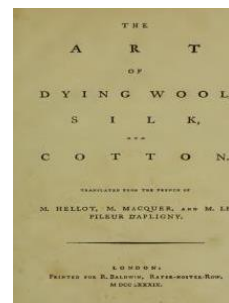
1776. L. d'Apligny, L'art de la teinture des fils et étoffes de coton : précédé d'une théorie nouvelle des véritables causes de la fixité des couleurs de bon teint, & suivi des Cultures du pastel, de la gaude, de la garance. Paris: Chez Servière, Libraire

Another French description of the 'old' Turkey red process as practiced in Darnetal, and in other manufactories of France.



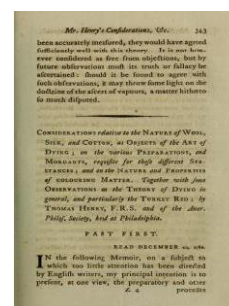
1789. The Art of Dying Wool, Silk, and Cotton. Translated from the French of M Hellot, M. Macquer, and Le Pileur d'Apligny. London: Printed for R. Baldwin

This English translation of works of Hellot, Macquer, and d'Apligny provides the process described by d'Apligny for dyeing 100 pounds of cotton Turkey red. It further describes the role of oil (source of oil and how it should be applied on the cotton) and dung in the process.



1790. T. Henry, Considerations Relative to the Nature of Wool, Silk, and Cotton, as Objects of the Art of Dying; on the Various Preparations, and Mordants, Requisite for These Different Substances; and on the Nature and Properties of Colouring Matter. Together with Some Observations on the Theory of Dying in General, and Particularly the Turkey Red, *Memoirs of the Literary and Philosophical Society of Manchester*, 3:343–408.

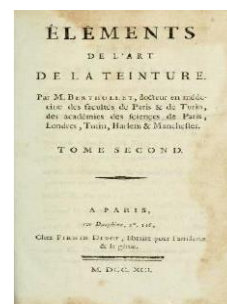
The part second of the memoir by Thomas Henry, a chemist and member of the Manchester Philosophical Society, provides a detailed account of the 'old' Turkey red process for dyeing sixty-six pounds of cotton yarn employing fifteen successive operations and involves use of Alicante barilla, sheep dung, Gallipoli oil, gall decoction, Roman alum, Smyrna or Cyprus madder and sheep blood. Special emphasis on use of freshest possible dung and blood. In part third, he further discusses chemistry of



different operations and action of the substances employed in the preparation for the Turkey red.

1791. C.L. Berthollet, *Éléments de l'art de la teinture*. Vol. 2. Paris: F. Didot.

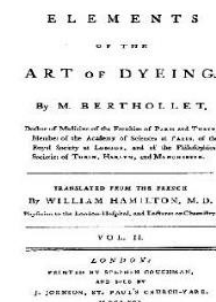
French chemist Berthollet provides 'old' process for dyeing Adrianople or Turkey red.



1791. C.L. Berthollet, *Elements of the Art of Dyeing*, Vol. II, Translated by William Hamilton. London: Stephen Couchman.

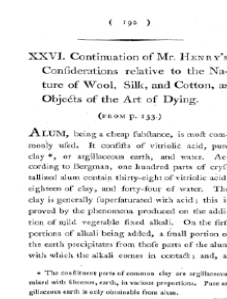
English translation of above text.

Berthollet provides 'old' process for dyeing Adrianople or Turkey red in seventeen successive operations – Scouring, dung bath, white bath (bath with olive oil), four salt treatments (treatment with soda), washing, galling, aluming, washing from the alum, second white bath, three salt treatments, dyeing and brightening. He gave a detailed discussion of the chemistry of various ingredients and steps. He emphasized that the type of madder employed has great influence on the colour produced.



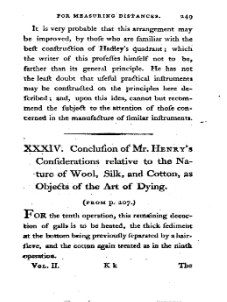
1795. H. Thomas, XXVI. Continuation of Mr. Henry's Considerations Relative to the Nature of Wool, Silk, and Cotton, as Objects of the Art of Dying, &c., The Repertory of Arts and Manufactures, 2: 192-207.

In this third in a series of four articles on the topic, Henry describes particular preparatory operations practiced for dyeing Adrianople or Turkey red for sixty six pound of cotton. It gives description of first to ninth operation of fifteen step process.



1795. H. Thomas, XXXIV. Conclusions of Mr. Henry's Considerations Relative to the Nature of Wool, Silk, and Cotton, as Objects of the Art of Dying, Part 1, The Repertory of Arts and Manufactures, 2: 249-275.

Henry continues to give details of tenth to fifteenth operation of Turkey red process. Also describes theory of dyeing for the process.



4. *Oriental Process for drying Red.*
direction to the piston rod. M the box that contains the condensing water. K plan of the piston, flaring the metal rings which by the springs LL are forced outwardly against the inside of the cylinder, so that the piston can adapt itself to any inequality that may arise. The piston rod is also made steam tight in the same manner at N. O a part of the fly wheel which regulates the motion.

II. *The Genuine Oriental Process for giving to Cotton Yarn or Stuff the fast or ingrained Colour, known by the Name of Turkey Red, as practised at Ahracan. From Neue Nordische Beyträge, by Professor PALLAS.*

A METHOD of giving a fixed red to cotton yarn, so much sought after by the Europeans in the present century, is now known in England, and practised in the southern parts of France: but, as it is not universally known, and as these processes are not only different, perhaps, from the oriental method, but like the one for dyeing cotton with madder described by Heliot, far inferior to that practised by the Armenians at Aleszra, the present information may not

Two investigators at Tübingen made, long ago, in a fossil publication which appeared in 1964, a discovery which might have led to the secret of the oriental proofs for dyeing with madder. He there remarked that the beautiful dye of the Turkish yarn, which withstands the strongest solvents, is a matter that the colour may be transferred from a thread of Turkey yarn to any other undyed thread. Hence it clearly appears, that either the dye itself, or the preparing liquor (*liquor*), or both, must be of a fat nature, and which is also in agreement with the fact that the dyeing has advantage on these grounds, as will be sufficiently seen by the following description of the oriental proofs employed to dye with madder, which I here give exactly as it was related to

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X. *Observations on the Effect of Morbidity in
dying Cotton red.* By J. A. CHAPMAN.
FROM THE ANNALS OF THE CHURCH.

IN dyeing cotton of a fine red colour, by means of madder, it is still the custom, as in certain medical preparations, to adhere strictly to the most whittical and extraordinary prescriptions, lest any change in the process should produce an

A month's work is hardly sufficient to complete all the operations supposed indispensable for obtaining the fine red colour, called *Adrianople* or *Turkey red*. In the process for which we successfully employed the following

The true means of simplifying this process is

not by working at random, and trying, without rules and principles, methods different from those at present made use of. That mode of proceeding leads very rarely, and always slowly, to successful

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On the Grecian Method of Dyeing Cotton Yarn Red. 323

ciple do not differ in *equal* proportions between the winter and spring filled oaks. This fact may lead to the discrimination of the proper time for cutting; which is, probably, when the sap has completely filled and dilated that part of the vegetable intended for use. This will make a difference in the season of cutting oak, elm, and other trees, firs, &c.

Finally, as the gallic acid does not seem to combine with the matter of skin, and as its astringency will coagulate the

IV. *Extrait of a Memoir on the Grecian Method of dying*
Cythere, Venice, 1804. 8vo. Pp. 12. Price 1s.

THAT beautiful red dye given to cotton in the Ottoman empire, is known in Europe under the name of Turkey red, Levant red, or Adrianople red. As it is believed among us that this colour results chiefly from the processes employed in the

The first process is that of cleansing the cotton, for which

purpose three leys are employed; one of soda, another of ashes, and a third of lime. The cotton is thrown into a tub, and moistened with the liquor of the three leys in equal quantities; it is then boiled in pure water, and washed in running water.

* From the *Annuaire de Chimie*, No. 32.

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XXXII. *Observations on Maddering; together with a simple and certain Process for obtaining, with great Beauty and*

I HAVE already indicated, in the *Annales de Chimie* and the *Journal de Physique*, that earths and metallic oxides have more or less the property of attracting and retaining the colouring parts of vegetable and animal substances: alumina

Alumina and metallic oxides do not retain, with the same force of adhesion, the colouring parts of all animal and vegetable substances, as those of mineral substances. Thus, the colouring parts of the latter are more strongly adherent to the oxide of iron, and to a greater degree than the oxide of tin; but the attractive force of the latter far surpasses that of the other earths and metallic oxides in regard to the colouring parts of the food substances.

much stronger than that of the other colouring substances, which may be classed in the following order: lacmoss, cochineal, logwood, yellow India wood, woad, carmalum, Brazil wood, red India wood, yellow berries, &c. The galls, sumach, and other astringent colouring substances, act principally by means of the gallic acid, and, in regard to their

To judge of the fixity of colours arising from animal and vegetable substances, the best method is to employ a ley of oxygenated muriate of potash or soda, with excess of alkali.

In the art of dyeing, and that of cotton-printing, the name of madder is given to that process by which the colouring parts of madder are transferred, by means of water with the aid of heat, to alumine, or to the oxide of iron fixed in any

⁴ From the *Annuaire de l'Inde*, No. 188.

improvements in agriculture, transmitted to the unborn millions. In my opinion it will be of utility to make it known in your *Annals*, and the answer to my request has continued in its being published." *None of the Editors of the Annals de Chimie.*

450 *Discussions on Modelling*

on longitudinal vibrations. There is this difference, however, that, as far as I have observed, the tone, when the vibrations take place in a spiral direction, is a fifth lower than when the rod vibrates in a longitudinal direction under the same circumstances.

mentioned in my discoveries respecting the theory of sound but respecting which I formed an erroneous opinion, can be explained. On a prismatic rod, one end of which was fastened in a vice, when I rubbed one of its edges, in a diagonal direction, with a violin bow, and threw fast over one of its horizontal sides, there appeared on this side a line proceeding

along its length, where the fan, which was thrown from the other parts by the vibrations, remained at rest; and this appearance took place on each side of the rod when held horizontally. The reason of this is, because at the edges which are further distant from the axis the range during the vibrations is greater than in the middle of each side; and on this account the fan, fixed which in the same form the same vibration.

shells, the same results in cross-section show the ridges produce shells on the edges must accumulate themselves longitudinally in the middle of each lobe nearest the axis where the vibrations are weakest.

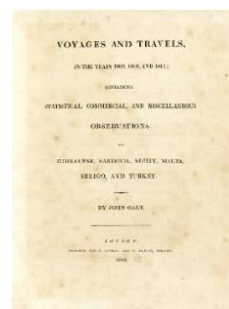
XLIII. *Observations on Madder; together with a simple and certain Process for obtaining, with great Beauty and Fixity, that Colour known under the Name of the Turkey or Adrianople Red.* By J. M. HAUSSMANN.
[Continued from p. 272.]

The Process.
AFTER making a castile ley of one part of good common potash dissolved in four parts of boiling water, and half a part of quicklime, which I afterwards flaked in it, I dissolved one part of powdered alum in two parts of boiling water; and while this solution of sulphate of alumine was still warm, to avoid

re-crystallization, I speedily poured into it successively, always stirring it without interruption, the above-mentioned caustic alkali, till the alumine it had at first precipitated after saturation to excess with sulphuric acid had been redissolved. I left to settle this solution of alumine, which exhaled ammonia, and which, on cooling, formed a precipitate of sulphate of potassa in very small crystals. I then mixed a third-third part

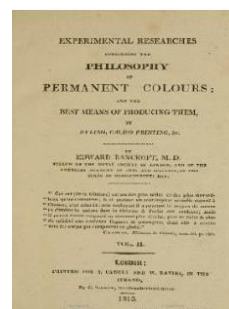
1812. J. Galt, Voyages and travels in the years 1809, 1810, and 1811: containing statistical, commercial, and miscellaneous observations on Gibraltar, Sardinia, Sicily, Malta, Serigo, and Turkey, London : Printed for T. Cadell and W. Davies

Galt describes Persian, Greek, German and Glasgow method of Turkey red dyeing.



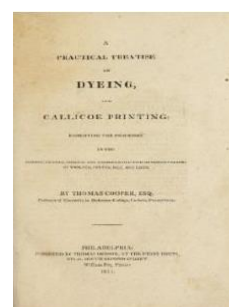
1813. E. Bancroft, Experimental researches concerning the philosophy of permanent colours: and the best means of producing them, by dyeing, calico printing, & c. Vol. II, London: T. Cadell, Jun and W. Davies

A section on 'Rubia peregrina, Lin. Smyrna or Levant Madder, and its application for dyeing the Turkey Red' gives an brief account of historical journey of Turkey red followed by detailed description of Papillon's Turkey red process along with critical remarks on each step showing comparison with process practiced in Rouen. He cited want of chemical knowledge in Papillon's description of using sulphuric acid, sal ammoniac and gum arabic, which he thought as peculiarity added by Papillon to render it more deserving of a reward. He further provides discussions on chemistry of Turkey red process citing works of contemporaries on suitability of different steps and ingredients used.



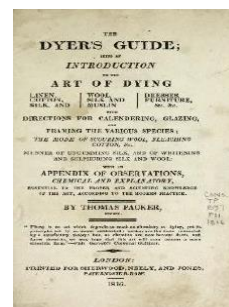
1815. T. Cooper, A Practical Treatise on Dyeing, and Callicoe Printing: Exhibiting the Processes in the French, German, English, and American Practice of Fixing Colours on Woollen, Cotton, Silk, and Linen. Philadelphia: Thomas Dobson.

Details of Borrel's process of dyeing Turkey red followed by Editor's own process for dyeing an imitation of Turkey red. Remarks on type and quantities of ingredients such as madder, alum, barilla etc. used in different Turkey red methods with explanations and some reasons for preferring one process to another.



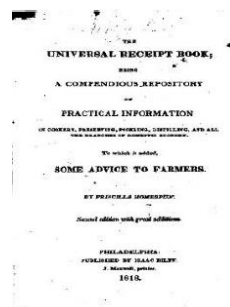
1816. T. Packer, The dyer's guide: being an introduction to the art of dyeing linen, cotton, silk, wool, London: Sherwood, Neely, and Jones

Provides a method for dyeing one hundred pounds of unbleached cotton Adrianople or Turkey red using alicant soda, fresh wood ashes, quicklime, sheep's dung and intestinal liquor, good olive oil, galls, alum, lizary madder, sheep's blood and white soap.



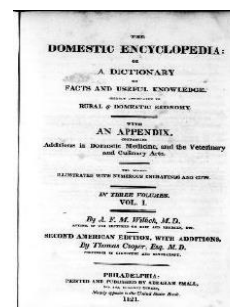
1818. P. Homespun. The Universal Receipt Book: Being a Compendious Repository of Practical Information. Philadelphia: Isaac Riley

Describes process of dyeing cotton or linen Turkey red. Homespun notes that the intensity of the red colour will be in proportion to the quantity of madder used in the dyeing: if the quantity of madder used is equal to the weight of cotton a red will be produced which will change to rose colour after freshening (clearing); for carmine colours two, three or even four parts madder should be used. Also suggests to add little chalk if water used do not contain it.



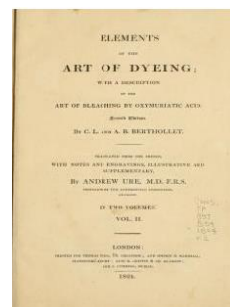
1821. A.F.M. Willich, T. Cooper, The Domestic Encyclopedia, Vol. 2, Philadelphia : Abraham Small

The section on dyeing gives description of Turkey red process by M. Haussman.



1824. C.L. Berthollet, A.B. Berthollet, Elements of the art of dyeing: with a description of the art of bleaching by oxymuriatic acid, 2nd Ed., with notes and engravings, supplementary and illustrative by Andrew Ure, Vol. 2, London: Thomas Tegg.

English translation of Berthollet's description of Turkey red process by Scottish chemist Dr Andrew Ure. Also gives notes on different printing methods of Turkey red.



1827. C. Cameron, III.—Soda ley for dyers, Transactions of the Society, Instituted at London, for the Encouragement of Arts, Manufactures, and Commerce, 45, 68-70.

Cameron describes a cheap and simple process of for making cheap soda liquor by decomposing muriate of soda by pearl-ash for the use of the Turkey red dyers.



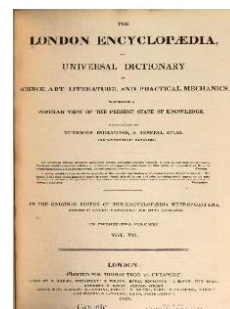
1828. C. Cameron, Method of making a cheap soda liquor, without crystallizing, for the use of the Turkey-red dyers, Journal of the Franklin Institute, 5(6), 388-389.

Same as Cameron's earlier description entitled 'III. Soda ley for dyers.'



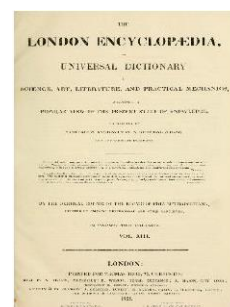
1829. London Encyclopedia, Vol. VII, London : Thomas Tegg

The section under heading 'Of dyeing red' provides account of process as given by Dr. Bancroft and his remarks in reference to the process observed at Rouen in France.



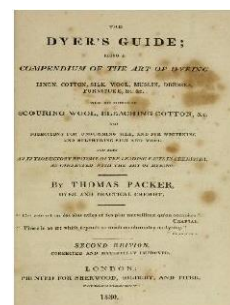
1829. London Encyclopedia, Vol. XIII, London : Thomas Tegg

The section under heading 'Madder' provides Papillon's Turkey red process.



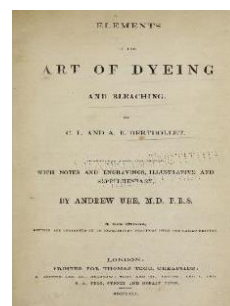
1830. T. Packer, *The dyer's guide: being an introduction to the art of dyeing linen, cotton, silk, wool*, 2nd Edition, London: Sherwood, Gilbert and Piper

Provides a method for Turkey red dyeing of one hundred pounds of unbleached cotton. Also cites miscellaneous observations relative to Adrianople red by contemporaries.



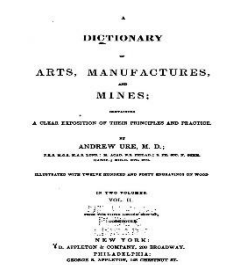
1841. C.L. Berthollet, A.B. Berthollet. Elements of the Art of Dyeing and Bleaching, with notes and engravings, supplementary and illustrative by Andrew Ure, A new edition. London: Thomas Tegg.

English translation of description of Turkey red process given in Berthollet's 'Éléments de l'art de la teinture' by Scottish chemist Dr Andrew Ure.



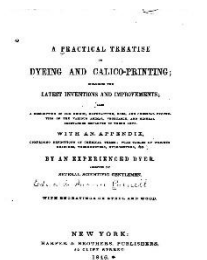
1844. A. Ure, A Dictionary of Arts, Manufactures, and Mines. 3rd ed. Vol. 2. New York: D. Appleton & Company.

Ure discusses technological advances Turkey red dying, describes the process in a production environment and comments on methods from other dyers.



1846. E.A. Parnell, A practical treatise on dyeing and calico printing.
New York: Harper and Brothers Publishers

Gives description of six variations of Turkey red process practiced at different places: German process, Elberfeld process, M. Hausmann process, French process by M. Vitalis, Process of Messrs. Montieth and Co. and Improved French process.



1849. The dyer and colour maker's companion, Glasgow: William Mackenzie

Describes method for preparing cloth for Turkey red dyeing and gives recipes for producing white, yellow, green, blue and black discharges on Turkey red.



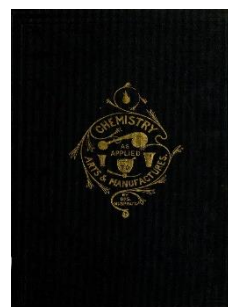
1860. C. O'Neill, A dictionary of calico printing and dyeing : containing a brief account of all the substances and processes in use in the arts of printing and dyeing textile fabrics

Gives a very brief overview of Turkey red process.



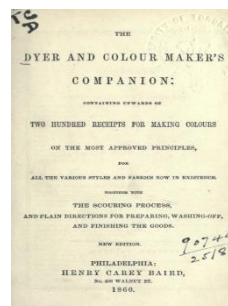
1860. S. Muspratt, E.N. Horsford, Chemistry, theoretical, practical, and analytical: as applied and relating to the arts and manufactures, London: W. Mackenzie

Section on Turkey red begins with brief details on its historical journey followed by description of Turkey red processes practiced in Glasgow and France. Further, it provides rationale of the Turkey-red Process explaining the action of the different ingredients employed.



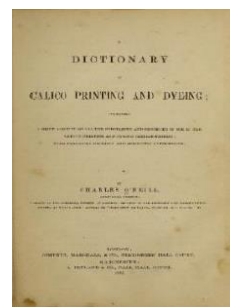
1860. The dyer and colour maker's companion: containing upwards of two hundred receipts for making colours on the most approved principles, for all the various styles and fabrics now in existence. New ed. Philadelphia: Henry Carey Baird.

Gives very brief details of preparation of cloth for Turkey red dyeing followed by recipes for white, yellow, green, blue and black discharge for printing of Turkey red.



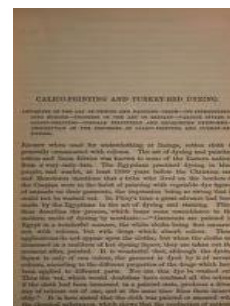
1862. C. O'Neill. A dictionary of calico printing and dyeing: containing a brief account of all the substances and processes in use in the arts of printing and dyeing textile fabrics. Manchester: A. Ireland and Co.

Provides a brief general illustration of Turkey red process. Mentions increased usage of garancine in Turkey red dyeing during the period. See also for explanation of terms such as red liquor, dung substitute etc. Also give a description of various types of discharges on Turkey red.



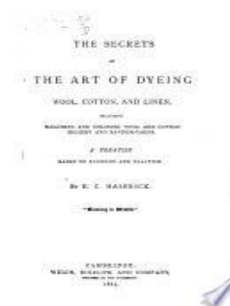
1869. D. Bremner, The industries of Scotland; their rise, progress, and present condition. Edinburgh: Adam and Charles Black

A chapter entitled 'Calico-Printing and Turkey-Red Dyeing' provides an overview of introduction and progress of calico printing and Turkey red dyeing in Europe, especially in British context.



1869. E.C. Haserick, The Secrets of the Art of dyeing Wool, Cotton, and Linen, including bleaching and coloring Wool and Cotton Hosiery and Random-yarns. A Treatise based on Economy and Practice. Cambridge: Welch, Bigelow, and Company

Provides details of eleven operation Turkey red process practiced in Elberfeld, Prussia.



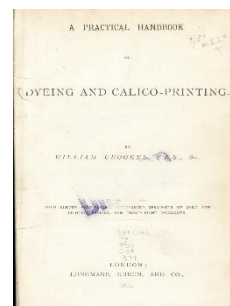
1872. W.B. Dick, Encyclopedia of practical receipts and processes, containing over 6400 receipts; embracing thorough information, in plain language, applicable to almost every possible industrial and domestic requirement, New York, Dick & Fitzgerald

The section of Art of dyeing gives details of French process of dyeing Turkey red.

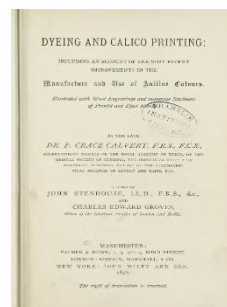


1874. W. Crookes, A practical handbook of dyeing and calico-printing. With eleven page-plates, forty-seven specimens of dyed and printed fabrics, and thirty-eight woodcuts, London: Longmans, Green.

Provides critical overview of Turkey red process and its chemistry citing experiments of contemporaries. Also contains Turkey red samples dyed with madder and alizarin.



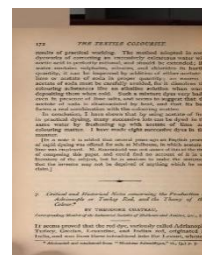
1876. F.C. Calvert, Dyeing and calico printing; including an account of the most recent improvements in the manufacture and use of aniline colours. John Stenhouse and Charles Edward Groves (Eds.) 2nd Ed. Manchester: Palmer and Howe



This text provides an outline of the Turkey red process as practiced in Manchester and Glasgow during the period along with samples of Turkey red as dyed, Turkey red after first clearing and Turkey red finished provided by Messrs. Steiner and Co.

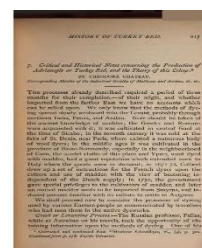
1876. T. Chateau, Critical and Historical Notes Concerning the Production of Adrianople or Turkey Red, and the Theory of This Colour. *The Textile Colourist*, 1: 172-178.

In first of eight part series of articles, Chateau gives historical account of origin of Turkey red and its migration to Europe.



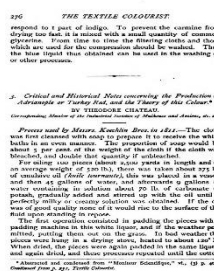
1876. T. Chateau, Critical and Historical Notes Concerning the Production of Adrianople or Turkey Red, and the Theory of This Colour. Ed. Charles O'Neill. *The Textile Colourist* 1: 217-231.

In next three parts Chateau describes the details of processes of Turkey red dyeing at various places and by different dyers. This section gives details of Greek or Levantine process, Armenian process, Turkish process, Grecian process by Felix, Early French processes, Papillon process, Haussman process, Vogler process, Gmelin process and Chatpal process.



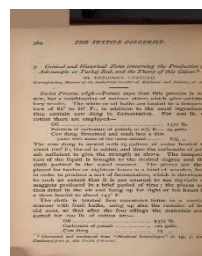
1876. T. Chateau, Critical and Historical Notes Concerning the Production of Adrianople or Turkey Red, and the Theory of This Colour. *The Textile Colourist* 1: 276-282.

Gives details of four process of Turkey red dyeing - Koechlin process, Vitalis process, Dumas process and Fries process.



1876. T. Chateau, Critical and Historical Notes Concerning the Production of Adrianople or Turkey Red, and the Theory of This Colour. *The Textile Colourist* 1: 384-397.

Gives details of Swiss process, Mercer and Greenwood process, Steiner process, Gastard process, Bernard process, Cardiner process, Rance process, Russian process and modern process by Schutzenberger.



1876. T. Chateau, Critical and Historical Notes Concerning the Production of Adrianople or Turkey Red, and the Theory of This Colour. *The Textile Colourist* 2: 27–33.

Describes use of oil in Turkey red dyeing and various processes of preparing the oil.

1876. T. Chateau, Critical and Historical Notes Concerning the Production of Adrianople or Turkey Red, and the Theory of This Colour. *The Textile Colourist* 2: 131–141.

Comments on theory of Turkey red dyeing based on opinions of Pallas, Alpingy, Chatpal, Bancroft, Vutich, Dingler and Vitalis.

1876. T. Chateau, Critical and Historical Notes Concerning the Production of Adrianople or Turkey Red, and the Theory of This Colour. *The Textile Colourist* 2: 191–200.

Provides accounts of Dumas, Persoz, Weisberger and Schutzenbeger's observations on theory of Turkey red dyeing.

1876. T. Chateau, Critical and Historical Notes Concerning the Production of Adrianople or Turkey Red, and the Theory of This Colour. *The Textile Colourist* 2: 262–272.

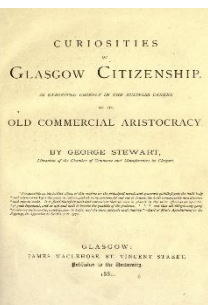
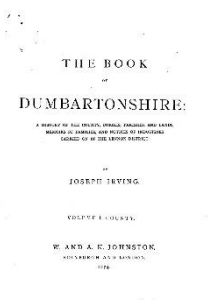
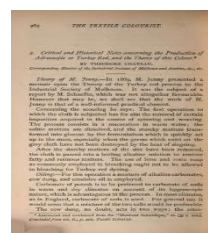
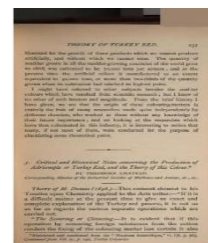
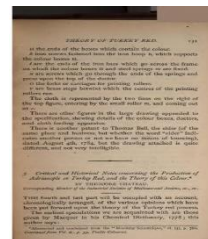
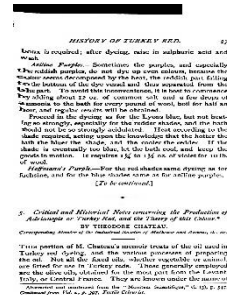
Continues to discuss theory of Turkey red dyeing based opinions of Henry, Wartha, Muller and M. Chateau and gives his conclusions on observations of different methods of dyeing and theory of dyeing.

1879. Joseph Irving, The Book of Dumbartonshire: A history of the county, burghs, parishes, and lands, memoirs of families, and notices of industries carried on in the Lennox district. Edinburgh: W. and A. K. Johnston

A chapter entitled 'Vale of Leven Industries: Turkey-red dyeing and printing' discusses industrial history and progress of the art of Turkey-red dyeing on the banks of the river Leven.

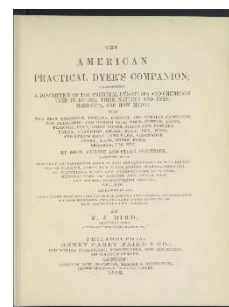
1881. G. Stewart, Curiosities of Glasgow citizenship; as exhibited chiefly in the business career of its old commercial aristocracy. Glasgow: J. Maclehouse

See for story of Turkey red journey and people involved in establishment of Turkey red industry in Glasgow: David Dale of Rosebank, George Macintosh of Dunchattan, James Monteith of Anderston.



1882. F.J. Bird, The American practical dyer's companion, Philadelphia: Henry Carey Baird & Co.

Gives a method for dyeing twist Turkey red by means of alizarin.



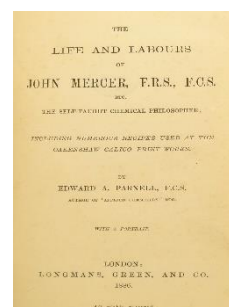
1885. A. Sansone, Alizarin-Red and Turkey Red Dyeing and Printing on Cotton. Journal of the Society of Dyers and Colourists 1 (8): 203–11.

Sansone describes the present state of Turkey red dyeing, which at that time had recently adjusted to the 'new' process. He also proposes potential structures for the colour complex, discusses dye sources, and hypothesises about the chemistry of the process.



1886. The life and labours of John Mercer, F.R.S., F.S.C. etc., the self-taught chemical philosopher: including numerous recipes used at the Oakenshaw Calico Print-Works, London : Longmans, Green

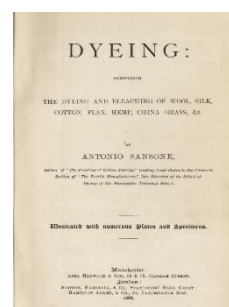
A chapter entitled 'On Turkey red, madder and garancin' comments on Mercer's experimentations on simplifying and shortening the process. The appendix at the end gives specification of patents granted to John Mercer and John Greenwood for 'certain improvements in dyeing and printing Turkey red and other colours' in 1846 and 'improvements in the oiling process in Turkey red dyeing' in 1852.



1888. A. Sansone, Dyeing: comprising the dyeing and bleaching of wool, silk, cotton, flax, hemp, china grass &c. Vol 1 and Vol. 2. Manchester : Abel Heywood & Son

Vol. 1 gives a brief overview of a 7-step Turkey red process using caustic soda, alizarin oil, acetate of alumina, chalk, cow dung, alizarin and sumach.

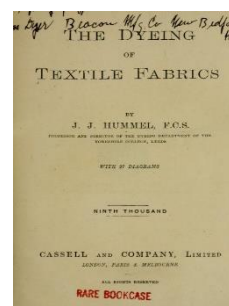
Vol. 2 contains samples of Turkey red.



1885. J.J. Hummel, The Dyeing of Textile Fabrics. London: Cassell & Company, Limited.

(First Ed. Sept. 1885, Reprinted April 1886, 1888, 1890, 1893, 1896, 1898)

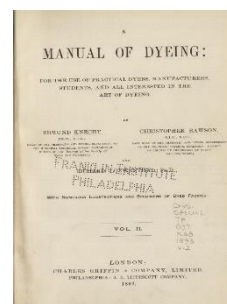
This book provides the most illustrative description of Turkey red process with fine details of ingredients, process conditions and machinery used. Though some specific details related to amount of alum and sodium carbonate used in different steps is missing. Hummel describes three different methods for producing Turkey red using alizarin: Emulsion process for dyeing 500 kilos. of Turkey-red yarn;



Steiner's process for dyeing 500 kilos. of Turkey-red cloth; and Sulphated oil process for dyeing 500 kilos. of yarn or cloth. Also gives details of machinery used in the process with drawings.

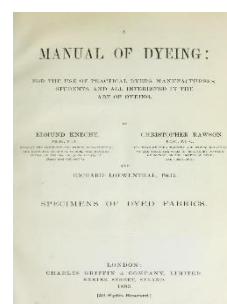
1893. E. Knecht, Christopher Rawson, and Richard Loewenthal. A Manual of Dyeing. Vol. 2. London: Charles Griffin & Company, Limited.

Knecht provides a brief overview of the process under the heading 'Turkey-Red (Adrianople Red; Indian Red)' followed by details of three different TR methods: I. Old Process or Emulsion Process, II. Steiner's Process for Turkey-Red on Cotton Piece Goods and III. New Turkey-Red Process (for Yarn and Piece Goods).



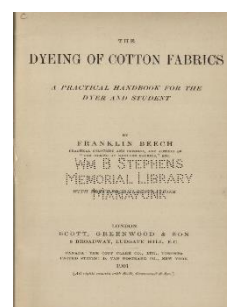
1893. E. Knecht, R. Christopher, R. Loewenthal. A Manual of Dyeing. Vol. 3. London: Charles Griffin & Company, Limited.

Two samples of dyed TR red in Pattern Sheet No. 7 Cotton: No. 37. Turkey red (Before oiling and steaming) and No. 38 Turkey red (After oiling and steaming).



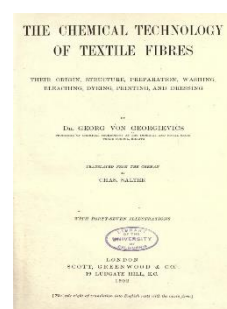
1901. F. Beech, The dyeing of cotton fabrics - a practical handbook for the dyer and student. London: Scott, Greenwood & Son.

Describes two process for dyeing Turkey red; a 12-step process using Gallipoli oil and a 7-step process using alizarine oil or Turkey-red oil. Suggests use of phosphate of soda in place of sheep dung for preparing green liquor used in 'old' process.



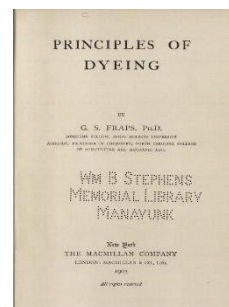
1902. G. von Georgievics, Chemical Technology of Textile fibers, London: Scott, Greenwood.

The section on 'Turkey red dyeing' begins with brief historical overview, followed by chemistry of Turkey red lake formation and preparatory step and overview of old and new Turkey red processes. A section on Turkey-red discharge style describes two methods for the discharge of Tukey red – the 'cuve decolorante' (decolorising vat) introduced by D. Koechlin and the caustic soda discharge.



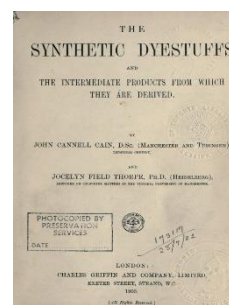
1903. G.S. Fraps, Principles of dyeing. New York: The Macmillan Company.

Brief description of new Turkey-red process using Turkey red oil, alum, sodium carbonate, chalk and alizarin in nine steps- boiling off, oil preparing, stoving, chalking, dyeing, second oil preparing, steaming and clearing.



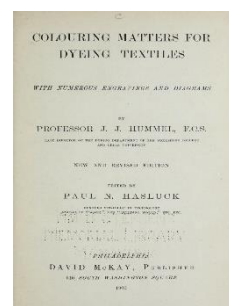
1905. J.C. Cain, J.F. Thorpe, The synthetic dyestuffs and the intermediate products from which they are derived. London: Charles Griffin and Co. Ltd.

Describes method for producing Turkey red using Turkey red oil for oiling, aluminium acetate as mordant and alizarin as dye.



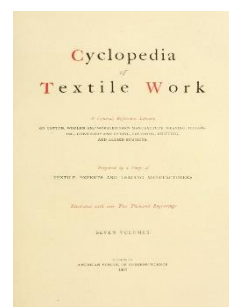
1906. J.J. Hummel, A. R. Foster, P.N. Hasluck, Colouring matters for dyeing textiles, Philadelphia: David McKay

Descriptions of Turkey red process same as in 'The Dyeing of Textile Fabrics' by J.J. Hummel.



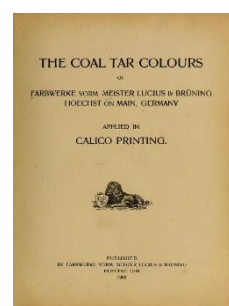
1907. Cyclopedia of textile work : a general reference library on cotton, woollen and worsted yarn manufacture, weaving, designing, chemistry and dyeing, finishing, knitting, and allied subjects, Vol. VI, Chicago : American school of correspondence

Give brief overview of a 13 step emulsion or old process and a 9 step the Turkey red oil or new process for Turkey red dyeing with alizarin paste.

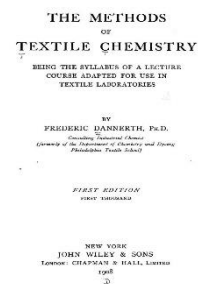


1908. Farbwerke vorm. Meister Lucius & Brüning, The coal tar colours of Farbwerke vorm. Meister, Lucius & Brüning, Hoechst on Main, Germany, applied in calico printing, Hoechst o/M

Provides a new red process for dyeing Turkey red with Turkey red oil and alizarin. Also gives methods of discharging Turkey red by means of chloride of lime, glucose alkali process and hydrosulphite-caustic soda process with examples of printed fabric samples.



1908. F. Dannerth, The methods of textile chemistry; being the syllabus of a lecture course adapted for use in textile laboratories. New York: John Wiley & Sons



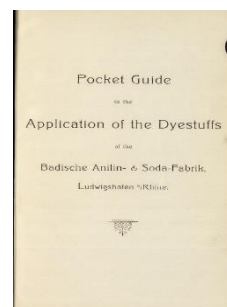
A section under heading Turkey red starts with comments on chemical control of the materials used in the turkey-red dyehouses followed by brief description of Old Style or Emulsion Method and New Style or Sulphated Oil Method. Describe different tests for examination of the bleached goods before dyeing, detection and determination of aluminium, calcium, and tin in the finished fabric, examination of the red for purity of shade, fastness of the red to various agencies and tests to distinguish turkey-red from other cotton reds.

1911. W.S. Carruthers, A New Process of Dyeing Turkey Red. Journal of the Society of Dyers and Colourists 27 (5): 123–26.



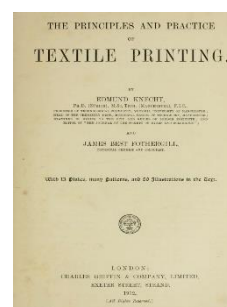
Carruthers describes a new process for dyeing Turkey Red and various other Alizarin dyestuffs discovered and patented by Mr. Rene Ott and the firm of Messrs. F. Bayer & Co., Elberfeld.

1911. Pocket guide to the application of the dyestuffs of the Badische Anilin- & Soda-Fabrik, Ludwigshafen o/Rhine, New York : Badische Company



Provides Turkey red process as new red, old red and simplified Turkey red process using alizarin as dye.

1912. E. Knecht, J.B. Fothergill, The principles and practice of textile printing, London : Charles Griffin



Detailed comments on mordant, oils and other substances used in Turkey red dyeing. Gives a summary of a method used on large scale for the production of a bluish Turkey red dyed with alizarin specially for discharging and a method of Turkey red dyeing patented by Erban and Spetch. Also gives details of acid and alkali discharge on Turkey red dyed cloths with examples of printed fabrics.

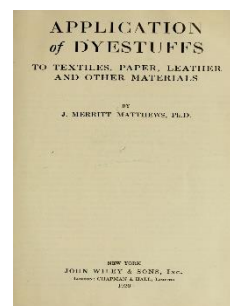
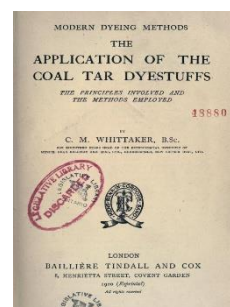
Provides details of 'old' and 'new' Turkey red process for dyeing with alizarin paste recommended by Meister, Lucius and Brüning, old process taken from The Dyeing of Textile Fabrics by J.J. Hummel, a simplified process patented by Badische Company, Steiner process for Turkey red on cotton piece goods and Bayer's patented process for dyeing Turkey red yarn.

Leigh describes his experiments involving different methods to determine the composition of Turkey red as it exists on the fibre in the commercial articles.

Gives details of two methods Turkey red dyeing with alizarin - old process or emulsion process for cotton yarn and new process or sulphated oil or Turkey red oil process for yarn and piece goods.

Gives the fourteen step old or emulsion process of dyeing summarized by Whittaker in adaptation from Pelsen's 'Turkish rot and Seine Concurrenten' and a short nine step process for Turkey red.

Parks attempts to explain the chemistry behind steps involved in TR dyeing based experimental observations. It gives brief overview of historical developments and description of traditional long TR process followed by experimentation details and interpretation of results illustrating chemistry of the process. A short process for dyeing TR and its chemistry was also discussed by in similar manner.



1962. R.A. Peel, Turkey red dyeing in Scotland: its heyday and decline, 68 (12) 496-505.

Peel discusses rise and fall of Turkey red industry in Scotland. Provides a critical overview of transformation of Turkey red process over time giving description of technical advancements through old to new processes.



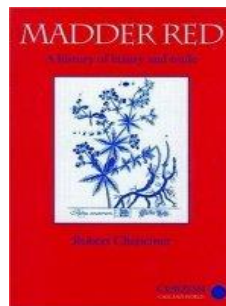
1989. J. Lopez, The transition from natural madder to synthetic alizarine in the American textile industry, 1870-1890. Ph.D. Thesis, Iowa State University.

Comments on historical journey of Turkey red and transition from natural madder, garancine and synthetic alizarin in the industry.



2000. R. Chenciner, Madder Red: A History of Luxury and Trade, Richmond: Curzon

A chapter entitled 'secret recipes of Turkey red' gives historical details, process of dyeing and trading.



2007. R.Karadag, E. Dolen, Re-examination of Turkey red, Annali di Chimica 97(7): 583-589.

Investigates the amount of the dyestuffs bound to mordanted cotton fibre and impact of number of oiling treatment of the cotton yarn in reconstructed Turkey red by using TLC (thin layer chromatography) and spectrophotometry.

[Link](#)

2010. W.T. Johnston, The secret of Turkey red – technology transfer with a Scottish connection, Biotechnic & Histochemistry 85(5):295-303.

Presents a historical account of Turkey red technology transfer in Scottish context. Also gives details of Papillon's TR process.

[Link](#)

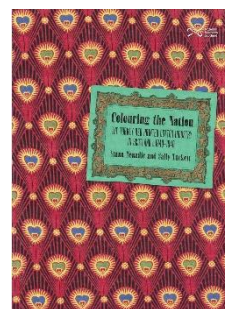
2012. S. Tuckett, S. Nenadic, Colouring the Nation: A New In-Depth Study of the Turkey Red Pattern Books in the National Museums Scotland, Textile History 43(2): 161-182.

Gives a brief overview of TR industry in Scotland, followed by details of Turkey red collection at National Museums Scotland and interpretation of pattern books.

[Link](#)

2013. S. Nenadic, S. Tuckett, *Colouring the Nation: The Turkey Red Printed Cotton Industry in Scotland, c.1840-1940*. National Museums of Scotland: Edinburgh

Tells the history of the TR industry with examples of fabrics from archive of Turkey red patterns at National Museums Scotland.



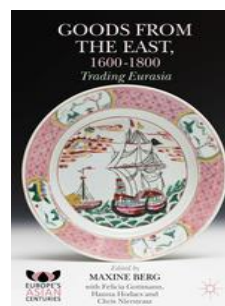
2014. J. Wertz, Turkey red textile dyeing in Glasgow: a cross-disciplinary investigation into Scotland's bygone industry. *Scottish Business and Industrial History*, 29:74-97.

Outlines the historical, geographic, and social context Turkey red to highlight its significance to Scottish cultural heritage.



2015. O. Raveux, The Orient and the Dawn of Western Industrialization: Armenian Calico Printers from Constantinople in Marseilles (1669–1686), in: M. Berg, F. Gottmann, H. Hodacs, C. Nierstrasz (Eds.), *Goods from the East, 1600-1800: trading Eurasia*. Springer.

Describes transfer of Turkey red techniques from East to West.



2015. H. Martinsen, Fashionable Chemistry: The History of Printing Cotton in France in the Second Half of the Eighteenth and First Decades of the Nineteenth Century, Ph.D. Thesis, University of Toronto.

Provides historical and account and developments in Turkey red industry in French context.

[Link](#)

2017. S. O. Demirkan, Rebirth of Turkey red, *Scandinavian Weaving Magazine*, 4: 18-21

Gives an outline of history of Turkey red and research in Cultural Heritage preservation and Natural dyes laboratory in Istanbul for its recreation for modern industrial practices.

[Link](#)

2017. J.H. Wertz, Turkey red dyeing in late-19th century Glasgow: Interpreting the historical process through re-creation and chemical analysis for heritage research and conservation. PhD thesis, University of Glasgow.

Presents a multi-disciplinary investigation of the chemistry of TR textiles and processes in the context of 19th c. Scotland using historical material re-creations and modern analytical chemistry.

[Link](#)

2017. J.H. Wertz, A. Quye, D. France, P.L. Tang, L. Richmond, Authenticating Turkey red textiles through material investigations by FTIR and UHPLC, ICOM-CC 18th Triennial Meeting Preprints.



Presents an idea of authenticating Turkey red based on the presence of an oil treatment on the cotton through non-invasive Fourier transform infrared (FTIR) spectroscopy and micro-analysis by ultra-high-performance liquid chromatography (UHPLC).

2017. J.H. Wertz, A. Quye, D. France. Taking historical chemistry to the bench: A new perspective for modern chemists through the re-creation and analysis of 19th-century Scottish Turkey red dyed textiles. *Mitteilungen: Gesellschaft Deutscher Chemiker*, 25: 302-328.



Gives historical overview of TR dyeing in Europe in general and Scotland in specific context. Describes 'old' and 'new' TR process and chemistry, followed by historical recreation and analysis of reconstructed TR. Also gives historical overview of alizarin synthesis and laboratory recreation of synthetic alizarin following historical methods.

2018. J.H. Wertz, P.L. Tang, A. Quye, D.J. France, Characterisation of oil and aluminium complex on replica and historical 19th c. Turkey red textiles by non-destructive diffuse reflectance FTIR spectroscopy, *Spectrochimica Acta Part A: Molecular and Biomolecular Spectroscopy*, 204: 267-275.

[Link](#)

Presents an investigation on historical and replica TR textiles with diffuse reflectance infrared (DRIFT) spectroscopy to study the coordination complex between cellulose, fatty acids, and the aluminium ions that form the basis of the colour lake.

2018. J.H. Wertz, A. Quye, D. France, Turkey red prints: Identification of lead chromate, Prussian blue and logwood on Turkey red calico. *Conservar Património: Studies in Historical Textiles*

[Link](#)

Provides analytical evidence for use of lead chromate, Prussian blue, and logwood for creating the distinctive prints on Turkey red calico from the 19th c.

Acknowledgement



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